

Weholite®

Culvert Sliplining with Weholite®



What is Weholite®

Weholite pipe is a large diameter, profile wall pipe made from high-density polyethylene (HDPE). Designed for gravity and low-pressure applications, Weholite's raw material properties have been combined with patented structural wall technology to create a lightweight engineered pipe with superior loading capacity. It is used to convey liquids or air, under ground in low-pressure applications. Weholite complies to ASTM F894 and is available in sizes from 18" to 120" (ID). Weholite pipe is much lighter than similarly sized concrete pipe. Combine this with longer manufacturing lengths and Weholite enables one to achieve installation savings in labour and equipment.



The Weholite Advantage

- ◆ Long service life
- ◆ Does not corrode like metallic culverts
- ◆ Superior abrasion resistance
- ◆ UV Resistant
- ◆ Hydraulically efficient (Design Manning 'n' factor of 0.01)
- ◆ Lightweight construction for transport efficient loads as well as enabling the use of light-duty lifting equipment
- ◆ Long laying lengths for faster installation
- ◆ Fully restrained joints
- ◆ Smooth outer wall and joint for easy insertion and grout placement
- ◆ Allows for fast field length adjustments with standard cutting tools
- ◆ Tough and durable permitting installations at sub-zero temperatures and also decreases the likelihood of pipe damage during handling and installation
- ◆ Extensive product offering for maximum flow capacity and minimal grout quantities

Why "Dig & Replace" when you can slipline with Weholite

- ◆ Simple way to extend the service life of deteriorated culverts
- ◆ Minimal traffic control
- ◆ No road/railway closures
- ◆ Lower construction costs
- ◆ Minimal social and environmental impact
- ◆ No post-installation road problems
- ◆ Cost effective permanent solution
- ◆ Utilized by various DOT's, municipalities, cities, towns and counties
- ◆ Hundreds of successful projects and counting



AN IDEAL WAY TO REDUCE TIME & LABOUR COSTS



**Weholite is ideal for
rehabilitating existing
culvert sites, especially
those;**

- ◆ With aggressive waters and/or corrosive soils
- ◆ Where road salts are applied
- ◆ Under high traffic roads
- ◆ With high fills
- ◆ Under railways



How to Join Weholite

Thermal Fusion/Extrusion Welding

A thermally fused extrusion welded joint is one of the recommended joining methods. The connection can be made using simple hand-held extrusion equipment or specially prepared pipe end-cuts. Extrusion welded joints are typically used where there is a need for a watertight culvert. This process enables the pipe to be connected at the inner outer pipe walls in a single operation from inside the pipe.



Threaded Joint

The unique Threaded joint* on Weholite pipes allows municipal maintenance crews or contractors to rehabilitate deteriorated culverts and drains without excavation and at a fraction of the cost of traditional "dig & replace" construction. The jointing system provides for sand-tight connections that are fast and positive eliminating joint separations commonly found with other piping systems.

*Threaded Joint not available in USA for pipe sizes of 48" ID and smaller



Wehoseal Joint Wrap

Wehoseal Joint Wrap is commonly used to connect Weholite pipe to other piping materials. It is made from a shrinkable cross-linked polyethylene material that conforms to the diameter of the pipe when heated. Sleeves can be supplied with additional fiberglass reinforcement for challenging conditions. Installation is performed in the field using a propane torch and a hand roller. A Wehoseal wrapped joint is ideal for silt-tight applications.



How to Slipline with Weholite

Culvert sliplining with Weholite is quick and easy, for it does not require specially trained personnel or equipment.

The Steps for a successful installation are:

Inspection

- ◆ Clean and inspect existing culvert to determine suitable Weholite pipe size diameter and laying length, paying particular attention to any deformation in the existing culvert and obstacles that may obstruct the sliplining operation

Pipe Selection

- ◆ After the correct diameter's and length's have been determined, select the appropriate Weholite size

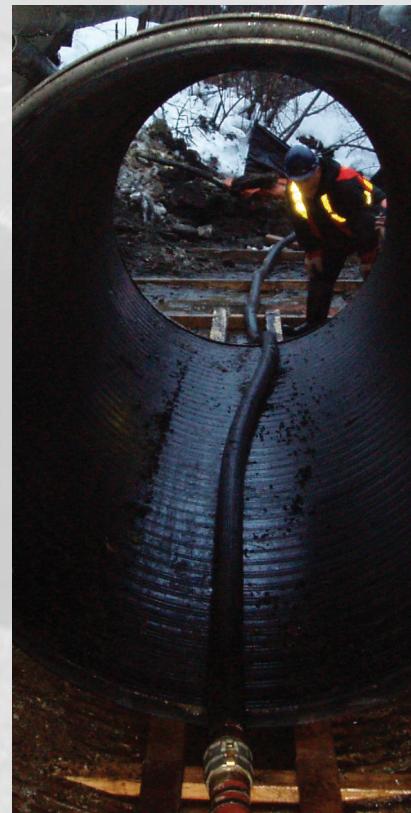
Liner Insertion

- ◆ Prepare jobsite to receive Weholite pipe and facilitate insertion process
- ◆ Install grout/vent tubes or standpipe at each end of existing culvert
- ◆ Where large diameter Weholite must maintain a specific line and grade, secure continuous guides or blocking to the existing culvert
- ◆ Insert the first pipe length into the existing culvert by pushing and/or pulling until the pipe end is exposed
- ◆ Insert an other length of pipe, if needed, and repeat process until the existing culvert has been lined
- ◆ All pipe lengths are extrusion welded together to complete a tight joint



Blocking

- ◆ Build bulkheads at culvert ends to contain grout within the annular void
- ◆ Bulkheads can be made from either concrete, native soils or wooden framework



Grouting

- ◆ Grout annular void by pumping or gravity with cementous or chemical grouts
- ◆ Grout pressure must not exceed the max allowable grout pressure of the particular Weholite pipe
- ◆ Large diameter Weholite may have to be grouted in lifts to keep grout pressure within limits
- ◆ Restore jobsite to a pre-construction condition

Weholite® – HDPE Closed Profile Wall Pipe

NPS		RSC	Type	Min. Inside Diameter		Max. Outside Diameter		Max. allowable Grout Pressure	
mm	in.			mm	in.	mm	in.	kpa	psi
460	18	160	F894	448	17.6	524	20.7	79	11.4
500	19.5	160	F894	486	19.1	557	22.3	52	7.5
530	21	160	F894	524	20.6	603	23.7	51	7.4
610	24	160	F894	600	23.6	689	27.1	59	8.5
690	27	160	F894	676	26.6	775	30.5	53	7.7
760	30	160	F894	752	29.6	862	33.9	48	6.9
840	33	160	F894	829	32.6	929	36.6	50	7.3
910	36	250	F894	905	35.6	1036	40.8	48	6.9
1020	40	250	F894	1006	39.6	1152	45.3	43	6.3
1070	42	250	F894	1056	41.6	1209	47.6	41	6.0
1220	48	250	F894	1207	47.5	1370	53.9	37	5.3
1370	54	250	F894	1358	53.5	1541	60.7	33	4.8
1520	60	250	F894	1509	59.4	1712	67.4	30	4.3
1680	66	250	F894	1660	65.3	1883	74.1	28	4.0
1830	72	250	F894	1811	71.3	2054	80.9	26	3.7
1980	78	250	F894	1961	77.2	2207	86.9	23	3.4
2130	84	250	F894	2112	83.2	2378	93.6	22	3.2

Notes:

1. Pipe available in:
50ft (15.24m) lengths
2. Grout pressure based on: SF=1.5, 24-hr grout set time, 73F, 2% initial ovality
3. Other laying lengths, diameters and RSC's not listed may be available upon special request



Culvert Rehabilitation Specifications

Reference Specification

ASTM D2321

Standard Practice for Underground Installation of Thermoplastics Pipe for Sewers and Other Gravity Flow Applications

ASTM D2412

Standard Test Method for Determination of Loading Characteristics of Plastic Pipe by Parallel Plate Loading.

ASTM F585

Practice for Insertion of Flexible Polyethylene Pipe into Existing Sewers

ASTM F894

Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe.

ASTM D3350

Specification for Polyethylene Plastics Pipe and Fittings Materials.

Liner Pipe Raw Material Requirements

The pipe shall be manufactured from a high-density polyethylene material, which meets or exceeds the minimum cell classification 334433C when classified in accordance with ASTM D3350

The raw material used to produce the pipe shall be a polyethylene compound qualified as Type III, Category 5, Class C, in accordance with ASTM D1248

The polyethylene raw material shall contain a minimum of 2%, well dispersed finely divided carbon black for UV stabilization. Additives which can be conclusively proven not to be detrimental to the pipe may also be used provided that the pipe produced meets or exceeds all of the requirements of this specification

The pipe manufacturers' Quality System shall be certified by an appropriate independent body to meet the requirements of the ISO 9001-2000 Quality Management Program

Compliance with the requirements of Section 3 of this specification shall be certified in writing by the pipe supplier upon request.

Liner Pipe Requirements

The pipe shall be manufactured with dimensions and tolerances in accordance with KWH Pipe internal manufacturing standard SQP-009. This standard meets the requirements of ASTM F894, when the pipe is marked as such. The nominal inside diameter of the pipe shall be true to the specified pipe size. The pipe shall be manufactured by the continuous winding of a closed profile onto suitably sized mandrels. It shall be produced to constant internal diameters. The pipe shall have a "smooth" OD for ease of installation.

Lengths of pipe shall be manufactured with end treatments that allows for consecutive lengths of pipe, with a profile cut end treatment along the helix to be field extrusion welded.

The pipe shall be manufactured in such a manner that the pipe is available in lengths from 3-60 feet and can be delivered to the job site in order to accommodate installation, storage or varying ground conditions. The laying lengths shall be determined by the design conditions.

Each standard and random length of pipe in compliance with this standard shall be clearly marked with all required marking as per the applicable standard.

The pipe shall be homogenous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.

The required liner pipe dimension and structural characteristics shall be selected based on considerations of

both the installation process and the anticipated traffic or service loads and other location specific conditions. These conditions normally include an evaluation of: (i) minimum anticipated clearance between the liner and the existing CSP culvert being rehabilitated (including allowances for joint offsets and separations and deflections)

(ii) Flow capacity of the rehabilitated culvert

(iii) External loads (earth and traffic)

(iv) Construction or installation loads (push/pull forces external grouting pressure)

(v) Structural support of the culvert developed by grouting.

The liner outside diameter should allow for sufficient clearance to accommodate the slip-lining process. The minimum inside diameter of the existing culvert should be determined in the field. If field inspection is not possible at time of tender, a liner pipe with an outside diameter 10% smaller than the inside diameter of the existing culvert should be selected for culvert diameters of 24 inches or less. For larger culverts, a liner pipe with an outside diameter, which is 5% smaller than the existing culvert inside diameter, may be selected.

The liner pipe should have sufficient wall stiffness to safely resist external hydrostatic pressures generated by ground water levels above the top of the pipe and/or by grouting pressures (if appropriate). When grouted, the liner pipe will react as though it was buried in soil; thus flexible pipe/soil backfill design equations apply.

Weholite

Versatile lightweight pipe system for gravity and low-pressure applications



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